

REMARKS

Claims 1 and 3-10 are pending in the present application and stand
5 rejected. Applicants respectfully request reconsideration of this
application in view of the amendments and remarks herein.

Claims 1 and 8 have each been amended to limit the suitable
zeolites to those having a ratio of Si:Al of greater than about 15. Basis is
in the specification at page 12, lines 9-13. Claim 1 was also amended to
10 recite that the sulfur trioxide is sorbed onto the sorbent at a site equipped
to handle bulk sulfur trioxide, transported to a site requiring delivery of
sulfur trioxide and desorbed there, and transported back to the original site
to recycle. Basis is in the specification at page 8, line 25 to page 9, line
11.

15 I. Rejection under 35 USC 103

The Examiner stated that he presumed that the subject matter of
the various claims was commonly owned at the time any inventions
covered therein were made absent evidence to the contrary, and advised
Applicants of their obligation to point out claims that were not commonly
20 owned. The Examiner's presumption is correct that the subject matter of
all claims herein was commonly owned at the time the inventions were
made.

Claims 1 and 3-10 were rejected under 35 USC 103 as
unpatentable over US Patent 5,223,237 of Simpson et al. in view of the
25 reference titled 'Study of Absorption of Sulfur Trioxide by Zeolites" by
Anurov et al. Applicants respectfully traverse this rejection.

The Simpson et al. patent was cited as teaching an obvious
variation of the claimed process and Anurov et al. was cited as disclosing
sorption and desorption of a mordenite having a silicon to aluminum ratio
30 of 9.2:1. Thus Applicants' invention was considered obvious.

Applicants' invention is directed to reversible sorption of sulfur
trioxide while maintaining high activity of the sorbent. To obtain this

continued high activity requires avoiding structural degradation of the sorbent. Structural degradation of the sorbent results in a loss of sorption capacity for sulfur trioxide. Applicants' invention is also directed to providing sulfur trioxide on a sorbent in a stable, transportable form.

5 Therefore when there is a need for use of small volumes of sulfur trioxide, small containers of SO₃-loaded sorbent can be obtained from a site equipped to handle the hazards presented by bulk storage of sulfur trioxide, the sulfur trioxide desorbed from the SO₃-loaded sorbent, and the used sorbent sent back for recycle. One requiring small volumes of sulfur
10 trioxide does not have to invest in and manage the hazards of its bulk generation and storage.

The cited references, singly or combined, do not teach or suggest this concept. The only teaching by Simpson et al. relating to preventing reduction in bed sorption capacity is to minimize the sulfur oxide residence
15 time on the sorbent (Column 9, lines 56-61). In contrast Applicants' invention permits an extended residence time while maintaining the structural integrity of the sorbent, and thus maintains its high reactivity in repeated cycles. This permits the sulfur trioxide to be sorbed onto the sorbent at one location, transport of the SO₃-loaded sorbent in a container
20 to a second location, followed by desorption of the sulfur trioxide from the SO₃-loaded sorbent at the second location, and return of the used sorbent for recycle. The required short residence time of sulfur oxides on the sorbent as taught by Simpson et al. is directly contrary to the purpose of Applicants' invention. See page 8, lines 22-24 and page 9, lines 4-11 of
25 the specification. Further Simpson et al. teach recycle within the same system as illustrated by Figure 1. There is no suggestion of transport of the sorbent to a different site for desorption. At column 7, lines 23 etc. Simpson et al. teach an embodiment that is quasi-continuous. Thus Applicants maintain that the claimed invention is not obvious over
30 Simpson et al.

Combining Anurov with Simpson et al. does not teach or suggest Applicants' claimed invention. In Figure 3 Anurov et al. depict a graph that shows that the adsorbent activity decreases with the number of cycles.

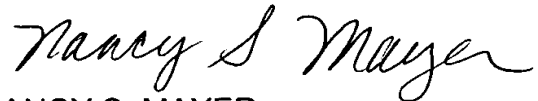
Neither cited reference teaches or suggests use of silica as a sorbent as claimed by Applicant. Neither teaches or suggests a zeolite having stability which retains capacity over storage. Anurov was cited as teaching a zeolite having a ratio of silicon to aluminum of 9.2:1. Based upon conversion to moles of the weight percentages of SiO_2 and Al_2O_3 given in Anurov's Table I, this number is in error, but regardless, Applicants have amended their claims to require a zeolite having a silicon to aluminum ratio of greater than about 15. This higher ratio reflects zeolites that are more stable than those with lower ratios. The lower amount of aluminum present compared to silicon means there is less aluminum present to react to form aluminum sulfate to lower the capacity of the sorbent. Further zeolites having the higher ratio of 15 or greater are more hydrophobic. Those having lower ratios as taught by the cited art are more hydrophilic. The higher ratio zeolites used in Applicants' claimed process provide a sorbent that preferentially absorbs sulfur trioxide over water. This is in direct contrast to the zeolites of Simpson et al, which are stated to preferentially absorb water. All of the zeolites specifically named by Simpson et al. have silicon to aluminum ratios of about 5 or less. Thus Applicants' invention provides sorbents which have high silicon to aluminum ratios, are storage stable over time thereby retaining capacity, and can be transported. These unexpected results are not suggested by the cited art. Applicants therefore maintain that Claims 1

and 3-10 are not obvious under 35 USC 103 over Simpson et al. or Anurov et al. singly or combined.

IV. Conclusions

In view of the amendments and remarks herein, Applicants respectfully maintain that Claims 1 and 3-10 are patentable over the cited art, and respectfully request that a patent be issued on these claims. Should any questions arise, the Examiner is invited to contact Applicant's attorney at the number noted below.

Respectfully submitted,



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